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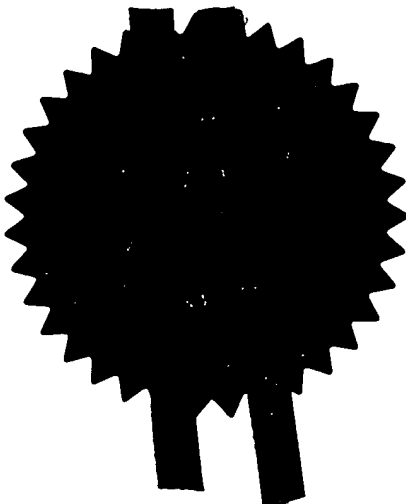


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Dated

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Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form).

The Patent Office

Cardiff Road
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1. Your Reference

P.6153 GBA

2. Patent application number

(The Patent Office will fill in this part)

06 FEB 1999

9902582.7

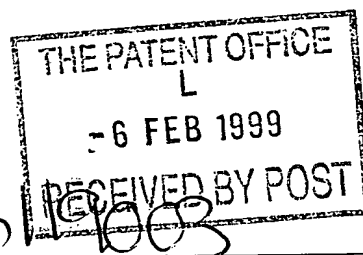
3. Full name, address and postcode of the or of each applicant (underline all surnames)

NEW TRANSDUCERS LIMITED
Stonehill
Huntingdon
Cambridgeshire
PE18 6ED
G.B.

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

G.B.



4. Title of the invention

LAPTOP COMPUTER

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

MAGUIRE BOSS
5 Crown Street
St. Ives
Cambridgeshire
PE17 4EB

Patents ADP number (if you know it)

00009191002

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number
(if you know it)

Date of filing
(day/month/year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing
(day/month/year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

Yes

a) any applicant named in part 3 is not an inventor, or
b) there is an inventor who is not named as an applicant, or
c) any named applicant is a corporate body:)
See note (d)

Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form.
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Continuation sheets of this form

Description 4

Claims(s)

Abstract

Drawing(s) 1

18

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77)

Request for substantive examination (Patents Form 10/77)

Any other documents (please specify)

11.

I/We request the grant of a patent on the basis of this application.

Signature

Date 05/02/99

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12. Name and daytime telephone number of person to contact in the United Kingdom

P.A. MAGUIRE

Tel: 01480 301588

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5

TITLE: LAPTOP COMPUTER

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DESCRIPTION

15 The invention relates to laptop and the like personal computers, including personal organisers, hand-held and the like computers having a display screen and one or more loudspeakers.

 It is known from WO97/09854 to suggest driving the
20 display screen of a laptop computer as a resonant panel loudspeaker, e.g. of the kind described in WO97/09842.

 It is also known to suggest driving the transparent face of a wristwatch to act as a buzzer or sounder i.e. to emit simple sound tones, e.g. to act as an alarm for the
25 wearer of the wristwatch.

 It is among the objects of the invention to provide a laptop computer having a display screen comprising a transparent panel-form member which can be driven as a

loudspeaker, e.g. to reproduce speech or music.

According to the invention a laptop or the like computer comprises a display screen, a resonant panel-form member, at least a portion of which is transparent and
5 through which the display screen is visible and means exciting the panel-form member to resonate to act as an acoustic radiator, the exciter being disposed at an edge or margin of the panel-form member so as not to intrude into the said transparent portion.

10 The member may be rigid and may be of plastics, e.g. polystyrene, or may be of glass or other transparent material.

More than one vibration exciter may be provided. The vibration exciters may be mounted in pairs to an edge or
15 marginal portion of the panel-form member or other portion of the member outside its transparent portion. The drive means may be coupled directly to the panel-form member.

The exciter(s) may be electrodynamic and may be inertial. Alternatively the exciter(s) may be piezo-
20 electric. The exciter(s) may be resiliently mounted on a frame member, e.g. the lid of the laptop computer. The panel-form member may be resiliently mounted on the frame along one or more edges. Thus the resilient mounting may extend along three adjacent edges and the exciter(s) may
25 be provided on the fourth edge.

The loudspeaker may be of the general kind described in International patent application number WO 97/09842. Thus the loudspeaker may comprise a member capable of

sustaining and propagating input vibrational energy by bending waves in at least one operative area extending transversely of thickness to have resonant mode vibration components distributed over said at least one area and
5 having a vibration exciter mounted on said member to vibrate the member to cause it to resonate forming an acoustic radiator which provides an acoustic output when resonating.

One or more marginal portions of the panel-form
10 member may be clamped or restrained. The whole periphery of the panel-form member may be mechanically clamped. The panel-form member may be mounted in means enclosing a face of the panel-form member whereby acoustic radiation from the said face is contained within the enclosure, in the
15 manner of an infinite baffle loudspeaker.

The panel-form member may form the face of a visual display unit or the like, e.g. the outer transparent protective surface of or over the visual display screen, e.g. liquid crystal display or plasma display, of a lap-
20 top or the like computer. A polymer-film liquid crystal display may be bonded or otherwise mounted on the panel-form member, whereby the loudspeaker and visual display functions are integrated.

The invention is diagrammatically illustrated, by way
25 of example, in the accompanying drawings, in which:-

Figure 1 is a perspective view of a laptop computer with the lid raised to show the computer keypad and to show the display screen, and

Figure 2 is a scrap cross-sectional view through the lid of the laptop computer of Figure 1.

In the drawings a laptop computer comprises a display screen mounted in a lid and showing, in Figure 1, the lid 5 partly broken away to reveal hidden detail.

The laptop lid is formed with a surrounding peripheral lip to define a shallow container in which is mounted a liquid crystal display (LCD) screen visible through a transparent protective cover in the form of a 10 resonant panel-form member adhesively fixed in the lid along three edges i.e. the two side edges and the bottom edge, by means of an interposed resilient suspension e.g. of foamed rubber strip. Pairs of moving coil inertial vibration exciters are mounted on the top edge of the 15 panel-form cover member to drive the panel to resonate to act as a loudspeaker and the exciters are mounted on resilient suspensions, e.g. foamed rubber, fixed to the lid. The exciters are hidden behind a return flange of the peripheral lip and thus are invisible in use. The 20 panel-form member may be of polystyrene.

The invention thus provides a laptop or the like computer in which a protective transparent cover over the display, or perhaps the display itself, is driven to act as a loudspeaker.

